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EXSECTION OF THE HIP-JOINT.

BY

C. T. POORE, M. D.,

SURGEON TO ST. MARY'S FREE HOSPITAL FOR CHILDREN, AND CHARITY HOSPITAL,
NEW YORK.

[REPRINTED FROM THE NEW YORK MEDICAL JOURNAL, MAY, 1877.]

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EXSECTION

OF

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EXSECTION OF THE HIP-JOINT.

THE following cases are published as a contribution to the study of exsection of the hip-joint in an advanced stage of the disease :

CASE I.—Martin G., aged fourteen years, was admitted into St. Mary's Free Hospital for Children, May 5, 1874, with the following history : Six years ago he fell upon the ice, striking on his left knee, having his leg in a flexed position. This was immediately followed by pain about the hip-joint.

After some time abscesses formed and were opened, so that at the time of admission there are many sinuses discharging pus in the upper part of the thigh, and gluteal region. The first abscess formed and opened on the inner aspect of the thigh near the perinæum.

On examination the patient is rather pale, the left thigh is flexed on the abdomen and adducted. There are four fistulous openings, one on the inner aspect of the thigh, one over the transverse process of the lower lumbar vertebræ, two on the antero-lateral aspect of the thigh, and one above Poupart's ligament. Dead bone can be detected through most of

these sinuses. He has some pain at night. There is no albumen in his urine. Appetite good. Is taking cod-liver oil and iron.

On May 30th, Drs. Watts and Mason assisting, the patient was etherized, and the head of the femur removed, the bone being divided just above the trochanter minor. The shaft of the femur at this point was perfectly healthy. The wound was stuffed with lint and extension applied.

The head of the bone was found much eroded, especially at its inferior part, and the acetabulum was extensively diseased and perforated.

The patient did well, and the wound was closed by the first of September, except a small sinus, from which there is a thin, watery discharge; no exposed bone can be detected. A long splint was applied, and patient allowed to go about. He was discharged November 11, 1873, wearing a shoe with a high sole. He can bear his whole weight on the limb, and has considerable motion at the hip-joint. He walks without a crutch. All the sinuses have closed.

Remarks.—It will be noticed that in this case the disease was confined to the bones immediately forming the joint; that the shaft of the femur at the point of section was perfectly healthy; that there was a sinus *above* Ponpart's ligament, and that the acetabulum was *perforated*. Also, that the first abscess opened on the *inner* surface of the thigh near the perinæum, and that the *head* of the bone showed most disease at its *inferior part*.

CASE II.—John H., aged six years, was admitted into St. Mary's Hospital, January 10, 1874. He has had disease of the left hip-joint for two years, following a fall. He has been treated by extension by means of a weight and pulley. About one year before admission an abscess formed on the anterior aspect of the left thigh, and was freely opened; later, another formed on its inner aspect near the perinæum. He walks with a crutch, and suffers considerable pain. On examination sinuses are found as above, the discharge from which is considerable. No exposed bone can be detected, nor is there any crepitus on motion at the joint, even when the head

of the bone is crowded in. Shortening, three-quarters of an inch.

His general condition is poor. There is no albumen in his urine. He was put upon a good diet, and took cod-liver oil and iron. Under this treatment he improved.

A short time ago dead bone was found about the joint, and to-day he was etherized, and the joint excised, Drs. Watts and Mason assisting. The head and neck of the bone were found much eroded, and the upper portion of the acetabulum eaten away. There was no perforation. Section was made above the trochanter minor. The bone at this point was soft and discolored. The limb was placed in a splint extending down below the knee and embracing the pelvis, and extension applied. The wound healed, with the exception of a sinus in the line of incision, through which dead bone can be felt.

Early in the fall he was up and about the ward, wearing a boot with a high sole, and was able to bear considerable weight on the limb. In December the glands in the groin became affected with caseous degeneration and suppurated. After enucleation the wound healed. In February, 1876, the discharge from the parts about the joint continuing, the line of incision was reopened, and the end of the femur exposed. It was found denuded of periosteum, carious, the medullary cavity enlarged, the bone of a dirty leaden color, and the end rough and irregular. On crowding the shaft upward the periosteum was found detached as far as examined (three inches), and the bone in the same diseased condition. About an inch or more was removed, the cut section showing the same unhealthy condition of the central portion as at point of first section. It was evident that the disease involved the greater portion of the shaft. The wound healed, with the exception of a small sinus. The patient was discharged May 30, 1876. He was able to walk with the aid of a crutch. He suffers no pain. Shortening, two inches. He has enlargement of the liver.

Patient presented himself at the hospital, December 26, 1876. His general condition is about the same as when he left. He still uses a crutch, and complains of some pain about the hip-joint on pressure. The sinus still discharges a little, and there is dead bone.

Remarks.—This was a case of long duration. The disease was confined chiefly to the head of the bone, the acetabulum being only eroded on its upper surface. The shaft of the femur was *soft* and *discolored* at the point of section at the time of the operation. The wound healed, with the exception of a sinus communicating with diseased bone. After some time the line of incision was opened. The periosteum was *found retracted* from the end of the bone, which was much *eroded*. Attempt was made to remove the diseased portion of the shaft, but, after exposing it for about three inches, it was still found to be of a *dirty color*, the *periosteum* but *loosely attached*, and on section the bone was *soft*, and the *medullary cavity* showing the same diseased condition as at point of first section. There did not appear to be any pus between the periosteum and the bone, nor had there been any attempt at the formation of an involucrum. Notwithstanding the amount of disease in the joint, no crepitus could be detected on account of the granulations in the acetabulum.

CASE III.—Willie C., two and a half years old, was admitted into St. Mary's Free Hospital, December 1, 1873, with the following history: About four months before being brought to the hospital he fell down-stairs, after which his mother noticed that he did not attempt to walk; he complained of pain on any motion of the right limb; he soon became restless at night and cried out in his sleep. At the time of his admission is pale, and his appetite poor. On examination there is found considerable swelling of the tissues about the right hip-joint; the limb is flexed, and rotated inward. He complains of pain on pressure over the joint, and upon any motion of the limb. He had extension applied, and was ordered iron, and to have hot water applied to the joint twice a day.

After some weeks the tissues about the joint broke down, and an abscess formed and was opened. His general condition did not improve; the joint continued very painful, and his sleep at night was disturbed.

In April, 1874, the joint was excised; the head of the bone was extensively diseased, the acetabulum but slightly affected. Section was made just above the trochanter minor.

The bone looked perfectly healthy at point of section; quite a large piece of fibrous tissue above the joint was united to the soft parts on the shaft of the femur. I was assisted at the operation by Drs. Watts and Mason. He was relieved from all pain; rested better the night after the operation than he had done since his admission. He improved for a short time, but soon there was bagging of pus, which it was impossible to prevent. He soon developed disease of the lungs, and died October 14, 1874.

On *post-mortem* examination the upper end of the femur was found rough and carious. The shaft was denuded on inner aspect for about two inches below the point of section, being the track of an abscess which extended from the acetabulum down on the inner aspect of the thigh to its middle. The end of the femur, which was enlarged, is firmly held in the cavity of the acetabulum. There is an exostosis on the femur corresponding to the lower border of the acetabulum. The bone is not denuded of periosteum, except at the above-mentioned point. The acetabulum was not perforated, but extensively diseased. The band of fibrous tissue which was united to the soft parts on the femur was evident as a strong band closing up the joint-cavity.

Remarks.—It will be noticed that the shaft of the femur was *healthy* at the point of section; that the end of the bone at the *post-mortem* examination was found *enlarged*; that the periosteum was *not detached*, and that there were osteophytes on the surface of the bone. I think that joining the shaft to the parts above by the piece of fibrous tissue was a mistake, as it tended to close up the joint-cavity and prevented the free discharge of pus. I do not know whether it had any influence on the result, but it certainly was not a gain.

CASE IV.—Amanda G., aged three and a half years, was admitted into St. Mary's Hospital, March 12, 1875, with the following history: Eighteen months ago she complained of pain in her right foot, and walked with a limp for a few days, when she refused to walk at all. She was treated by extension, but did not improve. Six months ago an abscess appeared on the external aspect of the thigh, and opened about

three inches below the trochanter ; this has continued to discharge profusely ever since. Her mother can assign no cause for the trouble. On examination, there is found a sinus as above, from which there is a profuse discharge of healthy-looking pus. Both limbs are plump, and no difference in their size can be detected ; there is no pain along the shaft of the femur on pressure. The right thigh is flexed somewhat on the abdomen. Crepitus can be detected by crowding the head of the bone inward ; no exposed bone can be found. Patient is a blonde, and seems to be in good condition ; appetite fair. Extension applied.

April 21, 1875.—Patient was to-day etherized, and, assisted by Dr. Watts, I made the usual incision over the trochanter, and exposed the bone. In attempting to throw the head of the bone out of the acetabulum the femur was fractured at the junction of the diaphysis with the epiphysis, just above the knee-joint. The head of the bone was removed from the acetabulum after section, just above trochanter minor. On examination of the cut end of the bone, it was found to be soft, discolored, the periosteum being easily separated, and on crowding the end of the bone up in order to see the extent of the disease, the same condition was found. It remained either to amputate at the hip-joint, or to remove the whole shaft of the femur : as the patient was apparently in good condition, the latter was decided upon. This was easily done, the whole shaft being drawn by traction through the original incision. There was no hæmorrhage, nor was the periosteum attached at any point. The fracture was found to have taken place obliquely from within outward and from behind forward, leaving a small portion of the external condyle attached to the epiphysis, but dead. The acetabulum was perforated ; the upper portion of the wound was brought together with suture, leaving a sufficient opening for the discharge ; no involucrum had formed. The limb was placed between sand pillows, and extension (four pounds) applied. 8 p. m., patient comfortable, does not complain of any pain ; pulse 128 and good ; temperature 100.5°.

22d.—Comfortable ; temperature 100.5°, pulse 136, a. m. ; temperature 100.5°, pulse 142, p. m.

23d.—Wound dressed; no pain nor swelling; pulse 120, temperature 100.2° , A. M.; pulse 136, temperature 100.2° , P. M.

24th.—Discharge from cavity of periosteum free and considerable; appetite good; quinine gr. ij every three hours; plenty of milk and eggs; pulse 104, temperature 98.5° , A. M.; pulse 100, temperature 100.2° , P. M.

25th.—Doing well, discharge not any more profuse than before the operation; appetite good; pulse 116, temperature 98.7° , A. M.; pulse 120, temperature 101.8° , P. M.

26th.—Seems brighter, takes her nourishment well; no pain; wound looks well; pulse 116, temperature 99.8° , A. M.; pulse 140, temperature 100.8 , P. M.

This evening her face was noticed to be swollen on the left side, but she made no complaint until 11.30 P. M., at which time there was found some swelling in the left side of the mouth on either side of the alveolar process of superior maxilla; there was no tenderness. She can open and shut her mouth freely; there is also some swelling on the cheek corresponding to the position of the swelling in the mouth. Ordered tr. ferri chlor. x every three hours. She has had no chill; temperature 103° , pulse 140.

27th.—Pulse 128, temperature 101.5° , A. M.; pulse 116, temperature 99° , P. M.

28th.—The swelling on the side of face has increased, the skin looks glossy, no pain on pressure. On examining mouth the first and second molar teeth are found loose, the second carious; thinking that this might be the cause of the trouble, they were removed. Pulse 100, temperature 99.2° , A. M.; pulse 120, temperature 101° , P. M.

29th.—Swelling of face more marked; still nothing can be found to account for the trouble. Appetite good, wound discharging freely, no bagging, pus perfectly healthy looking. The edges of the wound are beginning to cicatrize; they look perfectly healthy. Pulse 118, temperature 99.8° , A. M.; pulse 128, temperature 111° , P. M.

30th.—Pulse 136, temperature 99.5° , A. M.; pulse 132, temperature 102.5° , P. M.

May 1st.—Pulse 140, temperature 102.5° , A. M.; pulse 144, temperature 102° , P. M.

2*l*.—Pulse 124, temperature 100° , A. M.; pulse 140, temperature 101.2° , P. M.

3*l*.—Pulse 128, temperature 100.2° , A. M.; pulse 140, temperature 100.2° , P. M.

Since last note, patient has continued in about the same condition, with the exception that the swelling of the face is more marked, so as to close the left eye; breath offensive. On examining the mouth to-day there was found a slough of the inner portion of the cheek, just where the mucous membrane is reflected off from the gums. The finger can be passed through this opening, and carried all over the external surface of the superior maxilla, which is denuded of periosteum, and dead. This cavity is syringed out with carbolic acid and water. The general condition of patient about the same; the wound looks well; the skin under the eye and a little below the outer angle of the lid looks thin and discolored. Ordered whiskey, $\bar{\text{z}}$ iij.

4*th*.—Breath very offensive; cavity syringed out; the wound still looks well, but perhaps the granulations are not as bright. Pulse 140, temperature 100.5° , A. M.; pulse 148, temperature 100.9° , P. M.

5*th*.—Face is no better; breath offensive; respirations rapid; takes her nourishment well. The finger can now be passed back behind the superior maxilla into the spheno-maxillary fossa. Pulse inclined to be weak and rather sharp. A small opening has formed on her cheek about one inch below the outer canthus of eye. Pulse 124, temperature 100.5° , A. M.; pulse 120, temperature 101° , P. M.

6*th*.—Considerable sloughy tissue removed through the opening in cheek; cavity disinfected; wound in thigh looks badly, but discharge healthy; respiration 28. Pulse 140, temperature 100.2° , A. M.; pulse 140, temperature 100.5° , P. M.

7*th*.—No change; more tissue removed from cheek. Pulse 148, temperature 101° , A. M.; pulse 140, temperature 100.9° , P. M.

8*th*.—Pulse 140, temperature 99.5° , A. M. At 10 this morning she seemed brighter; called for some milk; voice strong. On going to her she seemed to have some difficulty in breathing, and immediately died.

Post Mortem.—Only the limb examined. The whole of the periosteum was removed, including the epiphysis. The knee-joint was perfectly healthy. The limb is much stiffer than at time of operation. There is found a deposit of bone about three inches long, and varying in width not anywhere more than one-quarter of an inch. The epiphysis is perfectly healthy. No other part examined.

Remarks.—It seems strange that there should have been so much disease with so few symptoms. There was no tenderness over the femur on pressure, and not much about the hip-joint. From the fact that the acetabulum was so extensively diseased and perforated, the disease must have begun in the joint, and extended to the shaft. The occurrence of disease of the superior maxilla, with extensive sloughing of the periosteum, I am unable to assign any cause for. The range of temperature, absence of chill and sweating, the general condition of the patient, the healthy state of the wound until two days before death, and the absence of any approach to a typhoid condition, would seem to negative the idea of pyæmia. A temperature of 99.5° just before death does not seem compatible with the supposition that she was suffering from purulent infection.

CASE V.—Katy M., aged six years, was admitted into St. Mary's Hospital for Children, January 5, 1876. Had been suffering from disease of left hip-joint for two years. She first complained of pain in the knee, and after two months began to limp, and then almost immediately ceased to walk. Six months later an abscess opened on the anterior aspect of the thigh. Three other openings formed before the date of admission. When examined, she showed all the symptoms of hip-disease in the third stage. Joint painful; patient cries out with pain at night, and cannot bear to be moved. The left thigh is flexed on the abdomen; there is considerable swelling about nates; her general condition is poor; no albumen in urine; ordered iron and extension.

A large abscess was aspirated January 12th, and again on the 30th of January and 1st of February.

As the patient seemed to be losing ground from the pain and profuse discharge, the joint was excised February 4th—

present, Drs. Peters and Watts—the bone being divided just above the trochanter minor. The head of the femur had entirely disappeared, with the exception of a long spike extending into the joint-cavity, which was filled with loose fragments. The bone, at the point of section, was soft and discolored. There was an abscess pointing above Ponpart's ligament. The acetabulum was perforated, readily admitting the finger. Patient was placed in a wire cuirass.

She rapidly improved after the operation, although the discharge continued profuse. In March the upper half of the thigh became swollen and looked glossy, and the deep tissue seemed thickened.

March 20th.—The upper portion of the femur, as felt through the wound, is denuded and thinned. How far it extends it is impossible to say. Her general condition has greatly improved. Her temperature (evening) varies from 100° to 101°.

June 10th.—She is to-day etherized, and the end of the bone is exposed. It is found soft and dark-colored; the periosteum separated, and the bone carious. About one and a half inch was removed. There is disease farther down. General condition continues good.

January 9, 1877.—She is up and about; the parts about the joint are thickened, and there is considerable stiffness; dead bone can be detected, which seems to be the end of the femur. There is no pain about the parts on crowding the bone up. There is a sinus leading down to the diseased shaft, from which there is considerable discharge. General nutrition of the limb good; it is as large as the other. No tenderness along the course of the femur. The liver is enlarged.

Remarks.—It will be noticed that the disease in this case was at an advanced stage; that there was an abscess pointing *above* Ponpart's ligament, and that the *acetabulum* was *perforated*; that the femur at the point of section was *soft* and *discolored*, and that at a subsequent period the wound was opened, and an attempt made to remove the diseased portion of the femur; but the disease was found to extend too far down; that the *periosteum* was *not intimately attached* to the bone, to the limit of the portion of the bone examined,

and that on section the same appearance of the shaft was found as at point of first section. The *end* of the bone was *eroded*.

CASE VI.—James C., fifteen years of age, was admitted into St. Mary's Hospital for Children, March 14, 1876. He gives the following history : Three years ago he had frequent falls, followed by limping and pain in right knee ; he was in a hospital for two and a half years, during which time quite a number of abscesses formed and opened spontaneously. At the time of his admission the right thigh is flexed, shortened, and inverted ; the knee-joint is also flexed and stiff. He suffers much pain, so that he is confined to the bed most of the time ; he lies in bed, propped up with pillows ; he has not been able to lie down for two years. There are four sinuses about the joint, through most of which dead bone can be felt. There is considerable discharge. Patient is thin and pale ; appetite poor ; liver enlarged. There is some albumen in his urine, but no casts can be found.

On May 21st the joint was excised—present, Drs. Peters and Watts. The head of the bone was found lying in the cavity of the acetabulum in pieces ; the neck was also splintered ; the bone was divided below the trochanter minor ; the shaft was found extensively diseased ; the bone was soft, thin, dark-colored, and the medullary cavity enlarged, so as to easily admit the finger for two or more inches ; the shaft was divided again lower down ; the periosteum was loose ; the condition of the bone at the point of second section showed the same diseased condition. The acetabulum was not perforated, and but slightly diseased.

Wound brought together in part, and patient placed in a cuirass, with extension so as to bring the knee down.

In July all the wound had closed except a sinus in the middle of the line of incision, through which the denuded end of the femur can be felt ; the discharge is very slight.

December 14th.—The patient has been about the ward for some months on crutches. He has been troubled with excessive œdema of the whole limb, which bandaging has relieved. To-day he has a high sole on his shoe. He cannot bear much weight upon the limb on account of his knee giving away. There is no pain about the hip-joint, and he has some fair

amount of flexion and extension. There has been no albumen since the operation.

Remarks.—It will be noted that there was extensive disease of the *shaft* of the femur; that it was of a *dark color*, and *soft*; that the *periosteum* was not *intimately attached* to it; that the *medullary* cavity was *enlarged*; that on making a second section the same diseased condition of the bone was found; that there was no sinus or abscess above Poupart's ligament; and that the acetabulum was *not* perforated. The occurrence of albumen is worthy of note, as well as the enlargement of the liver.

CASE VII.—May F., three years of age, was brought to St. Mary's Free Hospital for Children, March 25, 1875. Two months previous she had a fall while on board a steamer, and, when she arrived in New York, was lame. She dragged the toes of the left foot, and complained of pain in her knee. On admission she presented the symptoms of disease of the left hip-joint; tenderness, lordosis, and swelling. There is a spot of rupia about the size of a silver quarter of a dollar on her forehead. She is pale, of a blonde complexion. She was put on iron, had extension applied, and hot water to the joint.

Swelling and tenderness disappeared, and in July a long splint was applied, and she was allowed to go about the ward. She has had several attacks of eczema under the plaster, so that at times it had to be removed. She has also had attacks of pemphigus over her whole body, but most marked on the palms of her hands and soles of her feet. In December, 1875, an abscess formed on the anterior aspect of thigh, just below Poupart's ligament, outside of the vessels; this was aspirated, and about an ounce of pus obtained; it seemed superficial, and I do not think it communicated with the joint. She was about again in a few weeks. In the latter part of March, 1876, the posterior aspect of the thigh (upper portion) was found to be swollen, and upon examination fluctuation was evident. She had complained of no pain, and the abscess was only accidentally discovered. This was aspirated on the 23d and again on the 26th. There then appeared some swelling on the anterior aspect of the thigh, below position of the former abscess; the fluctuation seems deep. On the 29th

the abscess on the posterior aspect of thigh was freely opened, as aspiration did not seem to relieve it sufficiently. Patient was feverish; tongue coated.

April 15th.—Abscess opened on anterior aspect of thigh. There is a communication between the two abscesses.

June 30th.—Patient has been losing ground; abscess discharging profusely; the pus does not seem to come from the joint; a probe passed into either opening seems to pass toward the inner and deeper portions of the thigh.

September 15th.—On account of the hot weather, nothing has been done. She has improved somewhat since the first of the month. There is some bony crepitus in the joint. To-day she was placed under ether (present, Drs. Peters, Watts, and Yale); dead bone can be detected on the inner aspect of the femur, about an inch and a half below the joint. There are two openings on the postero-lateral portion of the thigh, which are united by a free incision, so that the finger can be made to enter the joint, which is found diseased. The soft parts were separated from the bone, and the head easily thrown out. It was then found that the inner aspect of the shaft anterior to the trochanter minor was extensively eroded, so that only a thin shell of bone was left, corresponding to the outer aspect of the femur. The head had nearly disappeared, and the cavity of the acetabulum was filled with loose pieces of bone, and was extensively diseased, but not perforated. The shaft was divided below the point of disease, when after section the bone seemed healthy. The upper and outer edge of the acetabulum was most diseased, and a portion removed; but, on account of the condition of the patient, it was thought best to desist from any further gonging of bone. There was an extensive abscess on the inner side of the ileum, which was pointing just within the crest. Whiskey, etc.

26th.—Passed a comfortable night; put into wire cuirass to-day; made no complaint of pain. Abscess near crest of ileum open to-day.

October 3d.—Wound cicatrizing; discharge moderate spicula of bone discharged.

5th.—Drainage-tube inserted.

On probing, dead bone is found through the opening near crest of ileum, situated about the rim of the pelvis.

December 16th.—Wound does not close ; discharge moderate ; no bagging ; patient's general condition good ; she suffers no pain.

January 16, 1877.—The discharge has been increasing for some days. To-day etherized patient in order to make a thorough examination of the parts. The end of the femur is found denuded, and the edge of the bone irregular. The compact tissue has not been thinned as much as in the other cases. The bone about the acetabulum is extensively diseased. The whole bone from the anterior-superior spine of the ileum down to the ischium seems to be in a carious condition. The bone is soft, so that it can be scraped off with the finger-nail ; a considerable portion was removed with forceps and rongeur. A piece of bone about the size of a filbert was found loose near the tuberosity of the ischium. An opening was made so as to afford a free escape of pus from the diseased bone.

On section of the portion of bone removed, it was found affected with articular osteitis. The cartilage had disappeared, and but a small stump of the neck remained. The line of junction between the shaft and the trochanter major was diseased, and a portion of the cartilaginous trochanter was loose. The disease seems to have extended down the centre of the bone, and to have entirely destroyed the whole inner surface of the compact tissue of the shaft just anterior to the trochanter minor. The compact tissue below the trochanter major was very thin, and had a worm-eaten appearance.

Remarks.—It is probable that the disease in this case began in the head of the bone as an articular osteitis, and that it extended down the shaft. The existence of hereditary syphilis is rendered probable by the rupia and pemphigus on the feet and hands. There was an abscess above Poupart's ligament, but *no* perforation of the acetabulum. There was disease of the rim of the pelvis.

In looking over the histories of these seven cases, it will be noticed that they were all in an advanced stage of the disease ; that from the condition of the bone a cure by means of rest

and mechanical support was impossible ; and that, unless relief from the pain and irritation was afforded, a speedily fatal termination was inevitable. Exsection of the joint afforded a chance, and, even if not successful in giving a sound limb, afforded immediate relief from all pain, and made what remained of life comfortable.

In four cases the shaft of the femur was diseased below the point of section, namely, in Cases II., IV., V., and VI. In Case IV. the whole diaphysis was removed, while in two cases, Nos. II. and V., after some months the wound was opened and a further section made of the bone. Notwithstanding the unhealthy condition of the shaft in Cases II., IV., V., VI., the wounds healed, but with a sinus leading down to the end of the diseased bone ; and the patients were able to go about the ward, and out, with the assistance of a crutch, without any pain. Case I. was discharged with the wound and all the sinuses healed ; no dead or exposed bone could be found ; and able to go about without a crutch. Cases III. and IV. died : one from secondary disease in the superior maxilla, and the other from phthisis. All the patients (except III. and IV.) are able to bear considerable weight on the diseased limb, and complain of no pain upon pressure. In Case V. the limb is stiff at the hip-joint, and since the bandage has been removed has increased in size, and is as large as the other.

The diagnostic value of an abscess or sinus above Poupart's ligament, indicating perforation of the acetabulum, as pointed out by Barwell in his work on "Disease of Joints," and by Bryant in the *Medical Times and Gazette*, 1869, is well illustrated in Cases I., IV., and V. In the first there was a sinus above the crest of the ileum and perforation, and in Cases IV. and V. there was a large abscess pointing above Ponpart's ligament and perforation of the acetabulum ; while in Case VII. there was a large abscess, no perforation, but disease of the rim of the pelvis. In Cases II., V., and VI., there is enlargement of the liver, and in Case VI. there was a trace of albumen before the operation, but there has been none since. In Case VII. there is reason for thinking that there is an hereditary syphilis. The advancing disease of the bones

of the pelvis, as well as the shaft, precludes all hope of recovery.

The acetabulum was extensively diseased in Cases I., II., IV., V., and VII., while it was only roughened in Case VI. The shaft of the femur in Cases II., IV., V., and VI., was diseased at the time of the operation below the point of section; and in Case VII. the section had to be made below the trochanter minor on account of extensive caries above that point.

The appearance and condition of the bone in the four cases were alike; it was soft and discolored; the periosteum seemed simply to envelop the bone without being intimately attached to it, so that the shaft could be easily drawn out of it; the cut end of the bone in three of the cases resembled rather coarse cancellous tissue, having its meshes filled with a dark-red granular material. The external compact tissue was reduced to a mere shell; while in the fourth the centre of the bone had disappeared, leaving a cavity which readily admitted the finger for two inches or more. In the latter case a second section was made lower down, but only to find the shaft in the same diseased condition. In Cases II. and V. the end of the shaft became extensively eroded; after some time the original incision was reopened and an attempt made to find the limit of the disease, but after exposing two or more inches of the shaft, the bone presented the same external appearance, and on section the central portion exhibited the same diseased condition as at the point of first division. In Case IV. the whole femur was removed through the original incision made for exsection of the head. On examination, after removal, the whole bone was of a *dirty leaden color* and very *light*; it resembled a bone from which the periosteum had been removed by maceration; the foramina for the vessels, to the naked eye, did not seem increased in number or size. The periosteum was not intimately attached to the bone at any point, but seemed simply to envelop it. There was no bleeding either from the periosteum or bone, nor was there any pus between them..

There had been no attempt at bony formation either in the periosteum (involucrum) or bone (osteophytes). On longitudinal section, after being macerated and dried, the medul-

lary cavity was found to be greatly enlarged at the expense of the compact tissue. At the upper part the cavity is filled with cancellous tissue for the distance of one and a quarter inch, it then gradually becomes less, until it almost disappears at about the middle of the shaft, and is then only seen in tufts; the compact tissue is very much thinned, being reduced to a mere shell as it approaches either extremity of the bone, being slightly thicker in the middle, where its greatest thickness amounts to only one or two lines. The medullary cavity in many places is perfectly smooth, and has a glazed appearance; what remains of the compact tissue seems, to the naked eye, normal, with the exception that here and there it has a worm-eaten appearance, as though a number of Haversian canals had become enlarged, showing a tendency of the hard structure to assume the appearance of cancellous tissues. On microscopic examination of a longitudinal section, it presents the appearance of healthy bone. At the lower end the bone has a worm-eaten appearance, and a portion of it has disappeared. The weight of the shaft, after drying, is about two drachms and a half. The periosteum, which was removed after death together with the epiphysis at the knee-joint, is found to be greatly thickened, and in several places there is a deposit of bone, which I am certain was not there at the time of the operation. The epiphysis is perfectly healthy; there is a thin layer of roughened bone attached to it.

The portion of the shaft of the femur removed from Case III. at *post mortem* differs in some respects from the above: 1. It was *enlarged* at the point of section. 2. The periosteum was *attached* except where it had formed one of the walls of the abscess. 3. There was an attempt at plastic inflammation, as shown by the exostosis. 4. The bone on removal was of a perfectly normal color. On section, after maceration and drying, the compact tissue was found reduced in thickness, and it had a more worm-eaten appearance than the first specimen; the medullary cavity was enlarged and partly filled with cancellous tissue.

In Cases II., IV., V., and VI., there had evidently been an extension of disease from the head of the bone along the shaft, so as, in one case at least, to involve the whole diaphysis,

and in two other cases it extended down at least to the middle of the shaft. It would furthermore seem probable that this affection of the shaft, when once it is well under way, does not become limited, but involves the whole diaphysis. There is a specimen in the pathological cabinet of the New York Hospital, taken from a child eight years of age, whose thigh had been amputated at the hip-joint, six months after an exsection of that joint for extensive disease, which illustrates this condition of bone. The bone is light, weighing only ten drachms. In external appearance it is perfectly normal. The epiphysis above the knee-joint is *diseased*. In the history of the examination of the limb no mention is made of the condition of the periosteum.

In the "Transactions of the London Pathological Society" for 1872, page 191, Mr. T. Carr Jackson reports the case of a patient nineteen years of age, whose hip-joint he had excised for disease of seven years' duration. The bone at the point of section was *soft*, and the *compact* bony tissue was *reduced* to a mere *shell*. He made a *second section* lower down, in hope of arriving at healthy bone, but in this he was *disappointed*. After the operation the general health of the patient improved for a time, but again became impaired on account of the discharge from numerous abscesses in the thigh. After amputation at the hip-joint he made a good recovery. Mr. Jackson states: "The femur after maceration weighed eight and a quarter ounces, against seventeen ounces, the weight of a healthy femur of the same size. The upper part had become enlarged and rounded, while stalactitic processes of somewhat porous but compact bone of irregular shape, and varying in size, project at various points. . . . The posterior part of the external condyle is softened."

On section, it is seen that the merest outside shell of bone remains. At the upper part a little cancellous tissue remains, and also for one and a quarter inch from the articular surface of the condyles upward. The rest of the shaft is an empty cavity, with a little fatty matter in it. The external compact tissue alone remains nowhere thicker than one or two lines. The whole bone may be said to have undergone an extensive

atrophic process, and remains, while preserving its external form, but a skeleton of itself.

Mr. Holmes reports a case in "St. George's Hospital Reports" (vol. i., page 147), where amputation was performed for extensive disease about the hip-joint, and where the femur was broken near its head in attempting to throw the head of the bone out in exsection. The femur was found soft and diseased at both ends.

In the same paper Mr. Holmes says: "It must often have struck surgeons, when excising a joint, that the operation has been put off too long. The bone is soft, and its periosteum peels off so readily that much care is necessary on the part of the assistant to avoid exposing it below the surface of the section. The compact wall appears thinned, and the cancellous tissue confused, crumbling, and filled with a somewhat purulent-looking marrow." He advocates amputation in these cases.

Mr. Annandale, in his paper on the "Pathology and Treatment of 'Hip'-Disease," on page 13 makes the following remarks: "I have met with two cases of hip-disease in which the whole femur, ileum, and probably other of the bones, were diseased through their whole structure;" and on page 27 reports a case in which "the bone was so *soft* that it had to be removed in pieces. In this way the neck, head, and great trochanter, were removed. The wound did not completely heal, so it was again enlarged, and two inches of the shaft of the femur removed. The shaft of the bone where divided was, however, *diseased in the same way*." The patient died six months later.

Dr. Sayre, in his work on "Orthopedic Surgery," reports having seen a case in which Dr. Spencer, of Watertown, N. Y., had removed "nearly the entire shaft of the femur, and perfect recovery took place." He does not state the condition of the bone removed, or what he considers a "perfect recovery."

In looking over the "table" of exsections in the above-mentioned work I find that in fifteen cases the section was made *below* the trochanter minor, on account of disease of the shaft; of these *seven* recovered and *eight* died. Of the seven who recovered the condition of the bone in two cases is re-

ported as being *necrosed*, in two there remained a sinus, and in the remaining cases no mention is made of the condition of the limb at the point incised. The cause of death in one of these cases was tetanus.

Out of fifty-nine cases of exsection twenty are reported as having died; in two-fifths of these the shaft was diseased, and section had been made below the trochanter minor.

The treatment of fracture of the shaft, when occurring at the time of exsection, must depend on the condition of the bone. If the probabilities are that the shaft is simply atrophied, as must have been the condition in the two cases reported by Dr. Sayre, it should be treated as any other fracture. But if the shaft is diseased, as in Case IV., either exsection of the whole femur or amputation at the hip-joint seems to be the only alternative.

The question as to the nature of the changes in the bones mentioned above I am unable satisfactorily to solve. The condition of the periosteum, caries of the lower end of the shaft, and changes in the medullary cavity, as well as caries of the end of the shaft in two cases later, in my own cases, disease of the epiphyses in the specimen in the pathological cabinet of the New York Hospital, and the osteophytes and abscesses in Mr. Jackson's case, all seem to point to some chronic inflammatory process rather than to simple atrophy of the bone. I am satisfied that the disease of the shaft, in Cases II., V., and VI., is the cause of the persistence of the discharge, and I do not think that anything short of an amputation at the hip-joint would afford relief, but the presence of enlargement of the liver contraindicates a resort to the operation.

I know of no means of ascertaining the condition of the shaft before commencing to operate, except that cases of disorganization of the joint, of long standing, should be looked upon with suspicion.

In regard to the question when rest and mechanical treatment should give place to exsection, my own cases show only the result of too long delay. In hospital cases, at least, it seems to me, exsection should be performed as soon as it can be satisfactorily proved that there is dead bone in the joint,

for, as a rule, recovery by natural means seldom takes place in these cases, and the danger of the occurrence of secondary disease of the liver and kidneys in these cases must not be lost sight of.

Since this paper went into the hands of the printer, the patient recorded as Case VII. has died from exhaustion. At *post-mortem* examination the end of the femur for about one-quarter of an inch was found necrosed and surrounded by an involucrum. The ischium was separated from the other bones and carious; the anterior portion of the ileum, including the anterior-inferior spine, was extensively diseased, as well as the whole acetabulum. On the inner surface of the ileum, about its middle, there was a spot of carious bone about three-quarters of an inch in diameter which had almost eaten through the bone, and there was some disease on the crest of the ileum. The femur, with the exception mentioned above, was perfectly healthy. There was no perforation of the acetabulum, nor thickening of the periosteum.

I have lately received a note from Dr. H. G. P. Spencer, of Watertown, N. Y., in reply to an inquiry in regard to the case mentioned by Dr. Sayre, in his recent work on "Orthopedic Surgery," and referred to in my paper, in which he removed the greater portion of the femur. The patient was a boy of about twelve years of age, who had had disease of the hip-joint since he was a child, and who, a few days before the operation, had fallen and fractured the femur at its lower third.

At the operation the head of the bone was found lying loose in the acetabulum. The periosteum was entirely separated from the shaft to some distance before the point of fracture, except a narrow strip on its outer aspect. The bone was dead, except at the attachment of the strip of periosteum. Section was made just below the point of fracture; but, as the bone seemed unhealthy at this point, a second section was made lower down. No involucrum had formed. The limb was kept extended until new bone had formed.

At the present time, a number of years since the operation, the patient has good motion at his hip-joint, and can walk miles with the aid of only a cane. The shortening is only

three inches. Dr. Sayre, who has the specimen in his museum, has kindly allowed me to examine it, and to him, as well as to Dr. Spencer, I am under great obligations.

The head of the femur is separated from the shaft, and is carious. The upper portion of the shaft, for the distance of an inch or more, is surrounded by an irregular deposit of bone. The external compact tissue does not seem to be reduced in thickness, nor is the medullary cavity enlarged. There seems to have been a total *necrosis* of the upper two-thirds of the shaft.

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